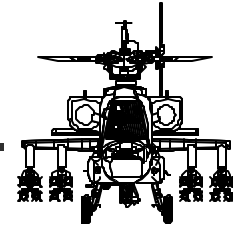


## 36<sup>th</sup> Annual Gun & Ammunition Symposium

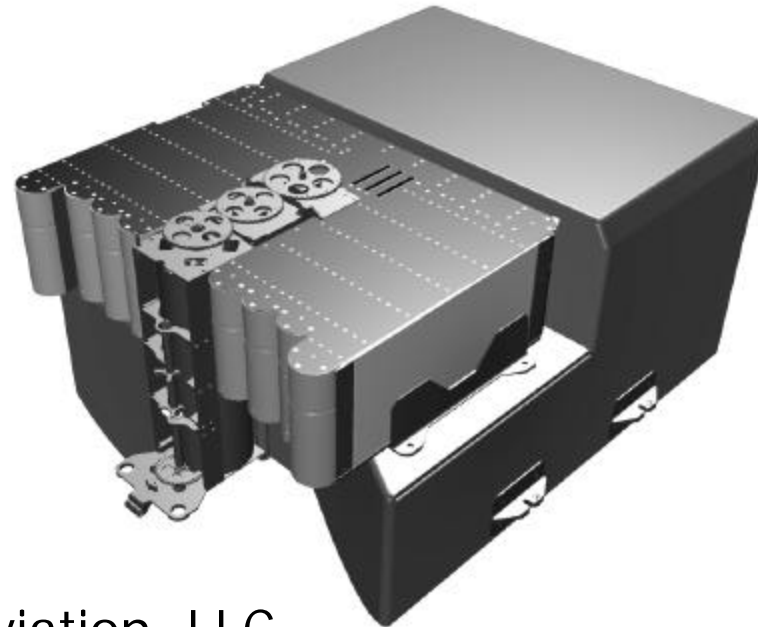
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# APACHE – 30mm Combo-PAK

Presented By  
**Gregory C. Hill**  
Director of Marketing  
Western Design

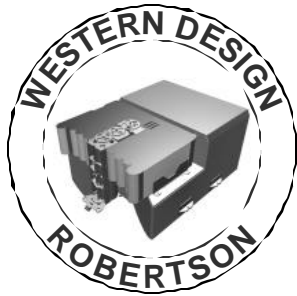
April 11, 2001



Program Prime: Robertson Aviation, LLC

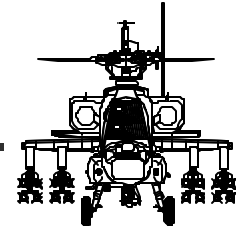
## Report Documentation Page

|   |  |  |
|---|--|--|
| <b>Report Date</b><br>11Apr2001   | <b>Report Type</b><br>N/A                          | <b>Dates Covered (from... to)</b><br>- |
| <b>Title and Subtitle</b><br>APACHE 30mm Combo-PAK  | <b>Contract Number</b>                             |  |
|   | <b>Grant Number</b>                                |  |
|   | <b>Program Element Number</b>                      |  |
| <b>Author(s)</b><br>Hill, Gregory C.  | <b>Project Number</b>                              |  |
|   | <b>Task Number</b>                                 |  |
|   | <b>Work Unit Number</b>                            |  |
| <b>Performing Organization Name(s) and Address(es)</b><br>Robertson Aviation, LLC   | <b>Performing Organization Report Number</b>       |  |
| <b>Sponsoring/Monitoring Agency Name(s) and Address(es)</b><br>NDIA (National Defense Industrial Association) 211<br>Wilson Blvd, STE. 400 Arlington, VA 22201-3061 | <b>Sponsor/Monitor's Acronym(s)</b>                |  |
|   | <b>Sponsor/Monitor's Report Number(s)</b>          |  |
| <b>Distribution/Availability Statement</b><br>Approved for public release, distribution unlimited   |  |  |
| <b>Supplementary Notes</b><br>Proceedings from the 36th Annual Gun & Ammunition Symposium & Exhibition 9-12 April 2001<br>Sponsored by NDIA                         |  |  |
| <b>Abstract</b>   |  |  |
| <b>Subject Terms</b>  |  |  |
| <b>Report Classification</b><br>unclassified  | <b>Classification of this page</b><br>unclassified |  |
| <b>Classification of Abstract</b><br>unclassified   | <b>Limitation of Abstract</b><br>UU                |  |
| <b>Number of Pages</b><br>15  |  |  |



# **APACHE – 30mm Combo-PAK**

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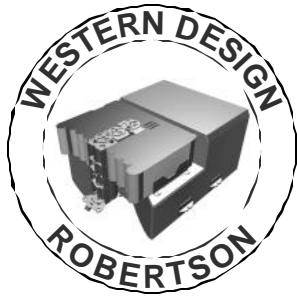


A Report:

**‘ENHANCEMENT OF A LEGACY SYSTEM  
TO MEET EVOLVING COMBAT NEEDS’**

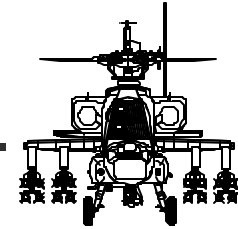
Providing:

**‘VERSATILITY FOR THE BENEFIT OF  
A SMALLER, MORE CAPABLE FORCE’**

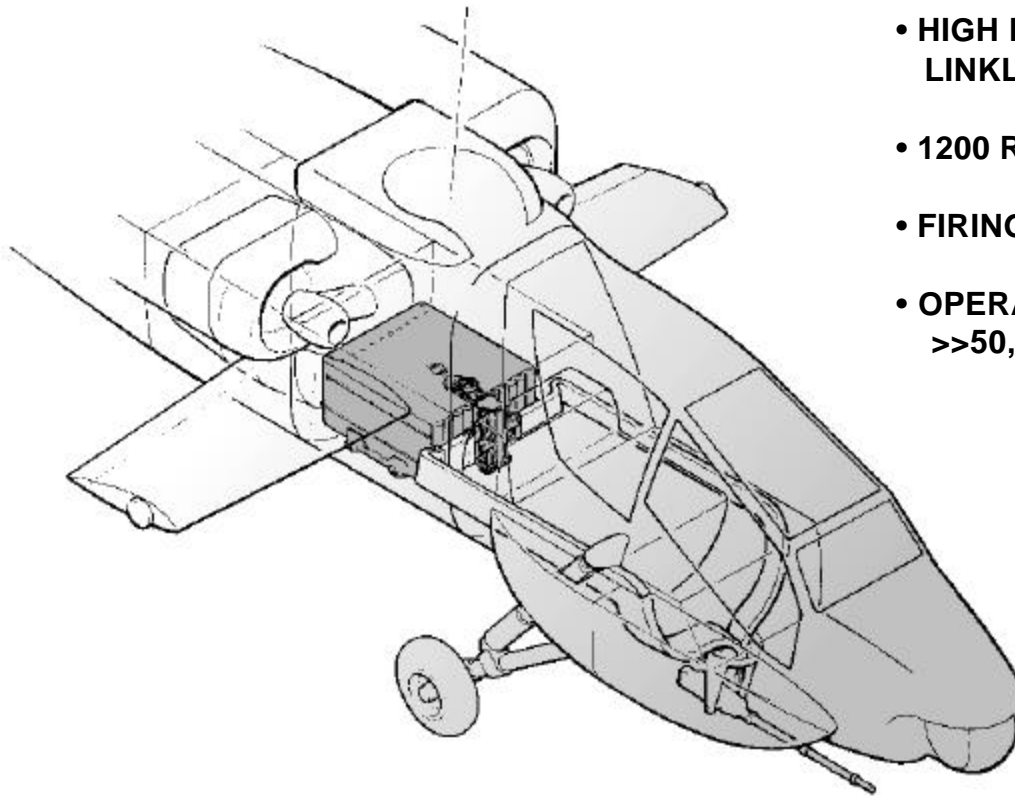


# **APACHE – 30mm Combo-PAK**

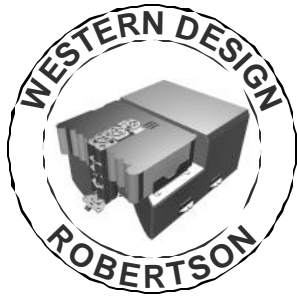
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## **AH-64A 30mm 12-PAK Magazine**

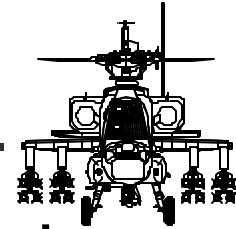


- HIGH DENSITY, TWO BAY, LINEAR LINKLESS MAGAZINE
- 1200 ROUND CAPACITY
- FIRING RATE 600 SPM
- OPERATIONAL RELIABILITY  
>>50,000 MRBF

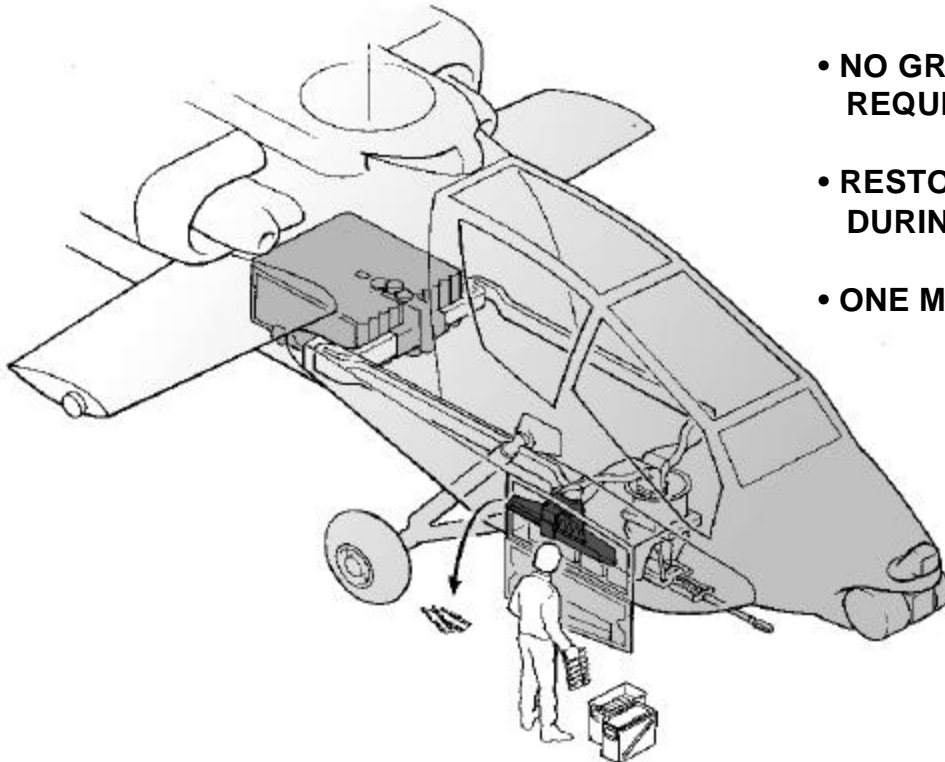


# APACHE – 30mm Combo-PAK

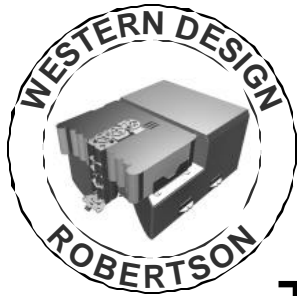
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## AH-64D 30mm 12-PAK "Sideloader"

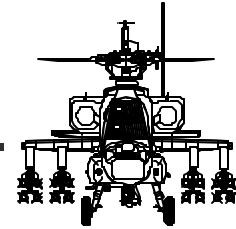


- 1164 ROUND CAPACITY
- NO GROUND SUPPORT EQUIPMENT REQUIRED
- RESTORES AMMUNITION TO STRIPS DURING DOWNLOAD
- ONE MAN OPERATION @ 100 RND/MIN



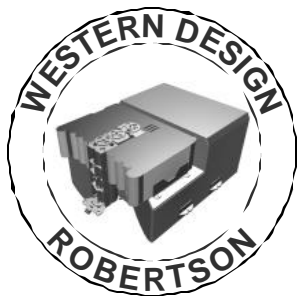
# APACHE – 30mm Combo-PAK

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## THE EVOLVING REQUIREMENT

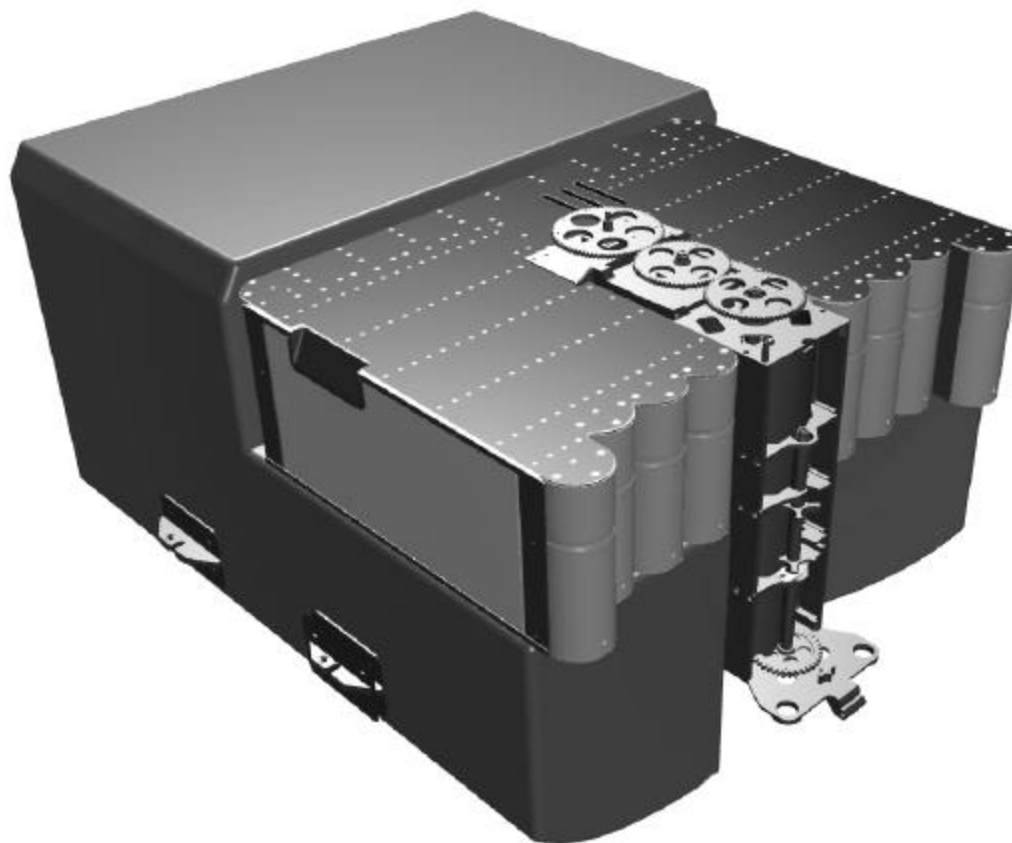
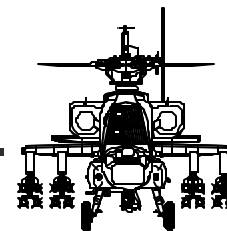
- **Operational need identified:**  
"Greater range required for Apache"  
(A lesson learned from Task Force Hawk in Kosovo)
- **Translated to a requirement:**  
Extended Range Fuel System (ERFS) became a part of the  
Apache Operational Capabilities Improvements Priority List
- **Internal Fuel Solutions Developed:**  
Reduction of ammunition load (full complement rarely used)  
to provide additional space for internal fuel (2 options)

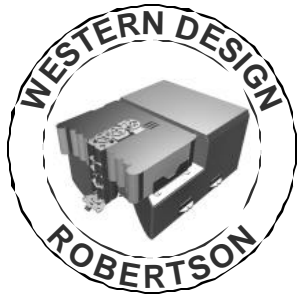


## APACHE – 30mm Combo-PAK

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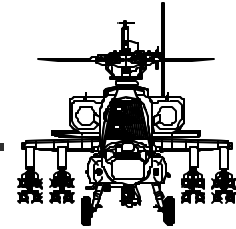
**COMBINATION:  
FUEL AND AMMO FOR VERSATILITY**





## **APACHE – 30mm Combo-PAK**

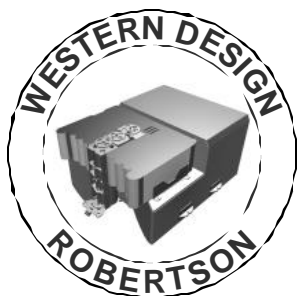
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### **APACHE HISTORY: AMMUNITION/FUEL**

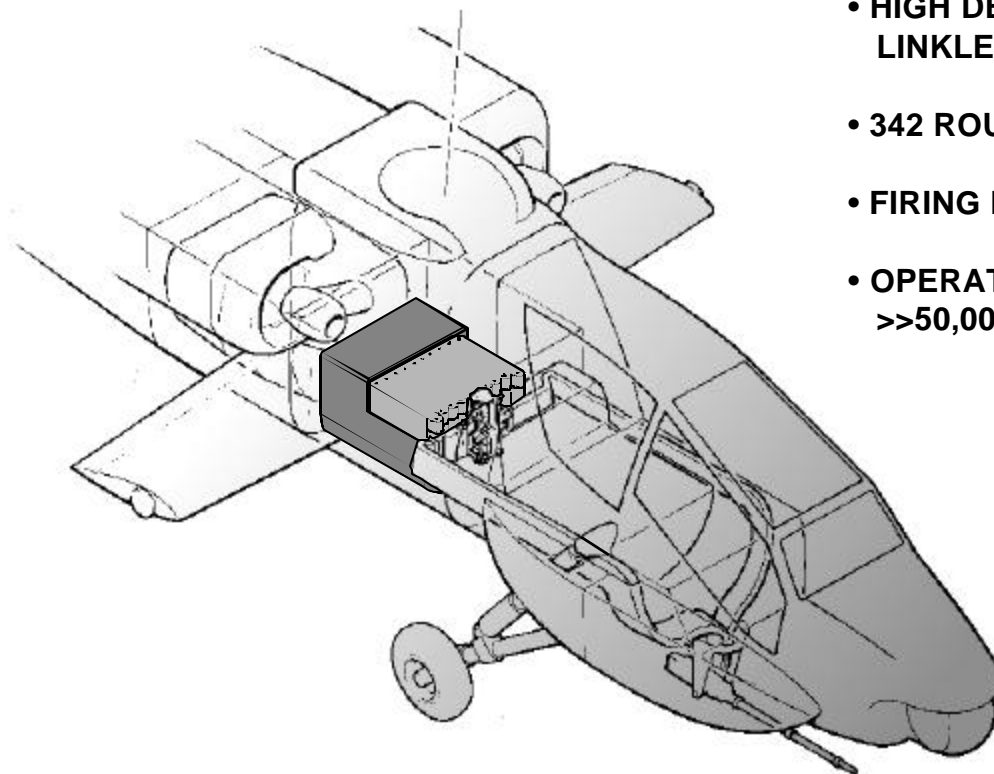
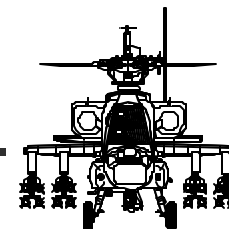
|   |   |
|---|---|
| <b>Six-PAK</b>  | Original design, 600 round capacity   |
| <b>12-PAK</b>   | Original fielded system, 1200 rounds  |
| <b>230 Gallons Fuel</b>   | External, Pylon-mounted tank  |
| <b>TIME PASSED: Concepts developed for reduced weight and/or additional internal fuel</b> |   |
| <b>130 Gallon Tank</b>  | Developed to eliminate use of external tanks  |
| <b>Combo-PAK</b>  | Compromise on fuel/ammo/weight to provide longer legs and a meaningful amount of ammunition |



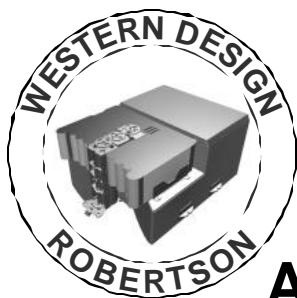


# APACHE – 30mm Combo-PAK

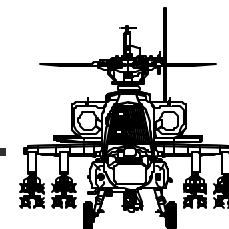
## AH-64A 30mm Combo-PAK



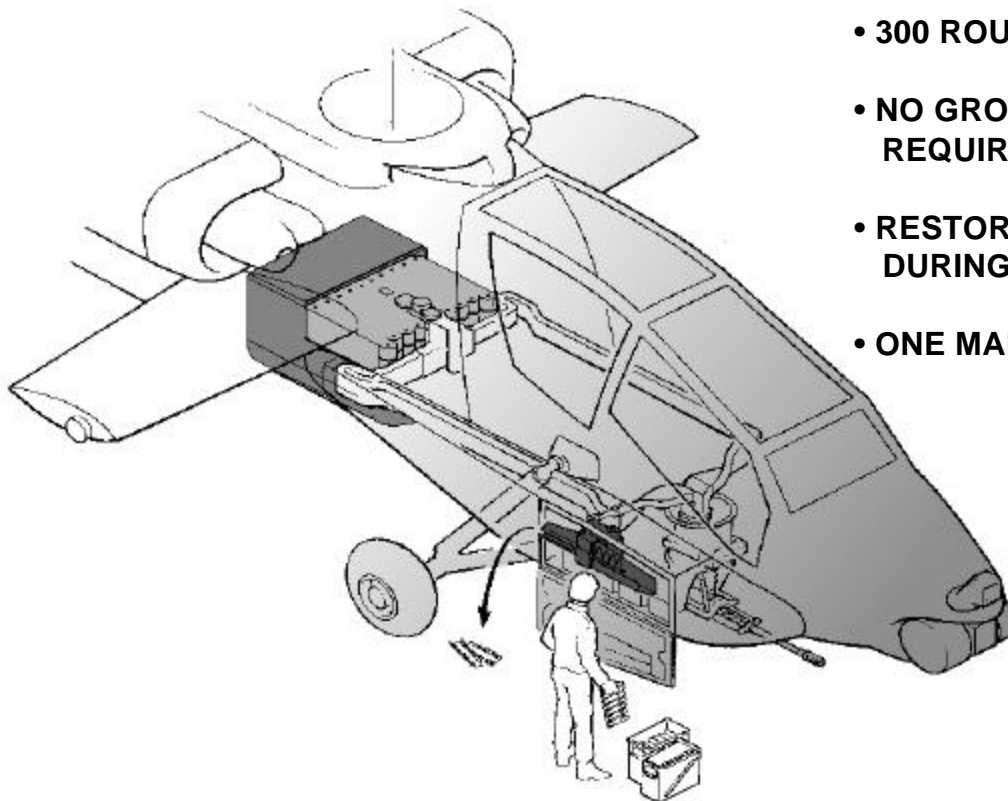
- HIGH DENSITY, SINGLE BAY, LINEAR LINKLESS MAGAZINE
- 342 ROUND CAPACITY
- FIRING RATE 600 SPM
- OPERATIONAL RELIABILITY >>50,000 MRBF



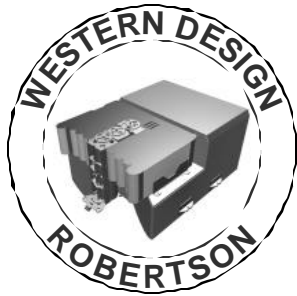
# APACHE – 30mm Combo-PAK



## AH-64D 30mm Combo-PAK "Sideloader"

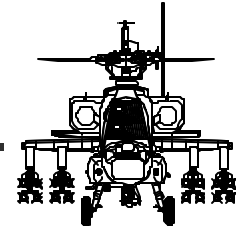


- 300 ROUND CAPACITY
- NO GROUND SUPPORT EQUIPMENT REQUIRED
- RESTORES AMMUNITION TO STRIPS DURING DOWNLOAD
- ONE MAN OPERATION @ 100 RNDs/MIN



# **APACHE – 30mm Combo-PAK**

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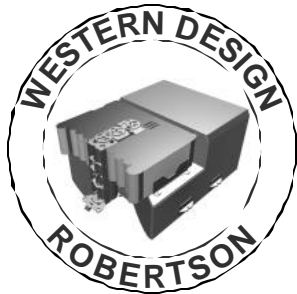
## **Combo-PAK: A SOLUTION FOR VERSATILITY**

### **Reduced Size Magazine:**

- Capacity:** -246 30mm rounds
- Construction:** -Light weight honeycomb Aluminum
  - Linear Linkless Chain Ladder

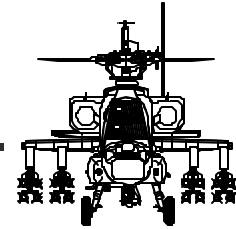
### **New Fuel Cell:**

- Capacity:** -100 gallons
- Construction:** -Honeycomb/Fiberglass Outer Container
  - Crashworthy, Self-Sealing Bladder



## **APACHE – 30mm Combo-PAK**

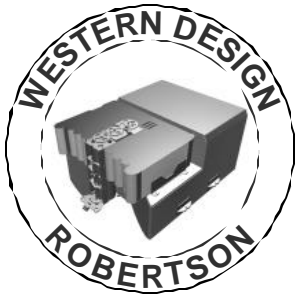
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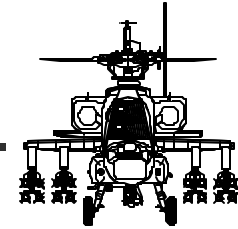
### **MISSION COMMANDER NOW HAS OPTIONS**

- 1) Existing 30mm 12-PAK Magazine
- 2) Robertson GUARDIAN Apache Auxiliary Fuel System
  - AH-64A Capacity: 130 gallons/96 rounds
  - AH-64D Capacity: 130 gallons/54 rounds
- 3) Robertson/Western Design Fuel/Ammunition Combo-PAK
  - AH-64A Capacity: 100 gallons/342 rounds
  - AH-64D Capacity: 100 gallons/300 rounds

**Interchangeable in less than 30 minutes**

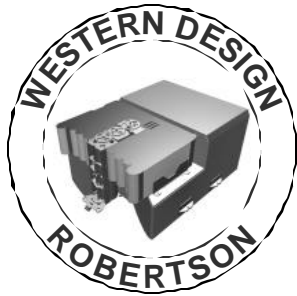


# APACHE – 30mm Combo-PAK



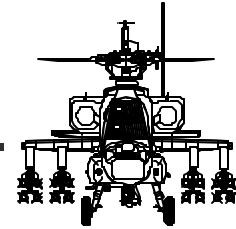
## STATISTICAL INFORMATION

| Equipment                      | Empty Wt. | Wt. of Fuel<br>and/or Ammo | Full Wt.                |
|--------------------------------|-----------|----------------------------|-------------------------|
| 12-PAK Magazine                | 182 lbs   | 855 lbs (alum.)            | <b>1037 lbs (alum.)</b> |
|                                |           | 1156 lbs (brass)           | 1338 lbs (brass)        |
| 130 Gallon Tank                | 215 lbs   | 871 lbs                    | <b>1086 lbs</b>         |
| 100 Gallon Tank                | 205 lbs   | 671 lbs                    | 876 lbs                 |
| 246 Rd. Magazine               | 75 lbs    | 190 lbs (alum.)            | 265 lbs (alum.)         |
|                                |           | 256 lbs (brass)            | 331 lbs (brass)         |
| 100 Gal + 246 Rd.<br>Combo-PAK | 280 lbs   | 861 lbs (alum.)            | <b>1141 lbs (alum.)</b> |
|                                |           | 927 lbs (brass)            | 1207 lbs (brass)        |



# APACHE – 30mm Combo-PAK

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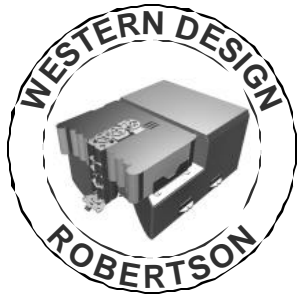


## Combo-PAK BENEFITS

**Increased Effectiveness for the Mission Commander through operational flexibility**

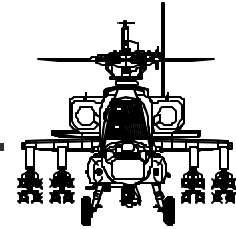
**APACHE Force Effectiveness enhanced:**

- Increased range (40 minutes flight time) without using external tanks
- 'Off-axis Drag' condition removed
- Pylon hard-point retained for maximum ordnance load



## APACHE – 30mm Combo-PAK

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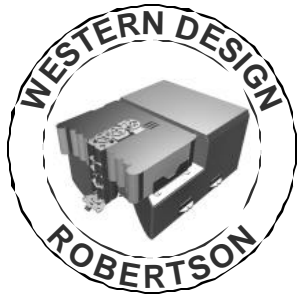
### WHY THESE COMPONENTS?

#### **Western Design Magazine:**

12-PAK Design Technology proven highly reliable over many years of low maintenance field use. A low risk system.

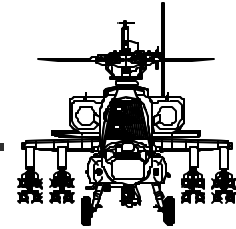
#### **Robertson Aviation Fuel Cell:**

Demonstrated long history with Auxiliary Tanks having crash worthy safety features that include self-sealing breakaway valves, Frangible Fasteners and Puncture/Tear Resistant Bladders



## APACHE – 30mm Combo-PAK

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### Concluding Thoughts:

Field Commander: Options for Needed Mission  
**FLEXIBILITY**

Industry: **Innovative Thinking** on Legacy  
Systems leads to effective  
Product Improvements

Combo-PAK: Available for field use in '02